

**ANNEX F**  
**WASTE MANAGEMENT PLAN**

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**U.S. Army  
Chemical Materials Agency**

**Project Manager for  
Non-Stockpile Chemical Materiel**

**Explosive Destruction System  
at Dugway Proving Ground  
Waste Management Plan**

**Final  
Revision 2**

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Waste Management Plan**

**Final  
Revision 2**

**March 2009**

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## 1. INTRODUCTION

Waste management practices are designed to protect workers, the public, and the environment from potential hazards and provide compliance with laws and regulations pertaining to waste. This annex presents information on the waste streams that will be generated by Explosive Destruction System (EDS) operations at Dugway Proving Ground (DPG) and describes how the wastes will be managed.

In general, destruction of the item(s) with appropriately shaped charges applied will begin by placing the item(s) in the EDS Containment Vessel. Once the item(s) is enclosed in the Containment Vessel, charges are then detonated to access chemical fill and deactivate the explosive components. Liquid treatment reagents are then added to treat the chemical fill. The liquid effluent (neutralent) and rinsates are drained and solid material is removed manually from the Containment Vessel. The wastes are containerized and will be stored in a less than 90-day waste storage area pending shipment to an offsite permitted treatment, storage, and disposal facility (TSDF). Following operations, the EDS will be closed out and deployed from the site.

**Table F-1** identifies the chemical agents to be treated along with the associated treatment reagents. Both liquid and solid waste will be generated from the EDS operation. Wastes generated will include but not be limited to:

- Mustard (distilled sulfur mustard [HD], thickened mustard [HT])/monoethanolamine [MEA] neutralent)
- Sarin (GB)/soman (GD)/MEA neutralent
- O-ethyl S-(2-diisopropylaminoethyl)methylphosphonothioate (VX)/MEA/sodium hydroxide (NaOH) neutralent

Table F-1. Chemical Warfare Materiel (CWM), Treatment Reagents,  
and Treatment Levels

Fill Type	Reagent	Treatment Level, mg/L <sup>a</sup>
HD, HT <sup>b</sup>	90 vol.% MEA	50
GB <sup>c</sup>	45 vol.% MEA	1
GD <sup>c</sup>	45 vol.% MEA	1
VX <sup>b</sup>	MEA/NaOH <sup>d</sup>	50
Empty <sup>e</sup>	Water	50 (HD)

Notes:

- <sup>a</sup> Treatment Level will be determined by chemical analysis.  
<sup>b</sup> Chemical treatment is followed by a 100°C water rinse.  
<sup>c</sup> Chemical treatment is followed by a 100°C water rinse.  
<sup>d</sup> 9 parts 90 percent by volume MEA, 1 part 50 percent by weight NaOH  
<sup>e</sup> Empty denotes the munitions identified as no known elements. These empty munitions will be treated with hot water followed by a single ambient water rinse.

GB = sarin  
GD = soman  
HD = distilled sulfur mustard  
HT = thickened mustard  
MEA = monoethanolamine  
mg/L = milligram per liter  
NaOH = sodium hydroxide  
vol.% = volume percent  
VX = O-ethyl S-(2-diisopropylaminoethyl)methylphosphonothioate

- MEA/water rinsate
- MEA/NaOH rinsate
- Spent decontamination solution and containment pan/sump rinse liquids
- Metal parts and fragments

- Empty overpacks, propellant charge cans (PCCs), multiple round containers (MRCs), and other containers
- Spent carbon (from in-line drum carbon filter)
- Spent carbon from the Environmental Enclosure (EE) air filtration system (if not reused)
- Pre-filters and high efficiency particulate air (HEPA) filters from the air filtration system
- Grayloc<sup>®</sup> seal and O-ring
- Used personal protective equipment (PPE)
- Laboratory wastes
- Miscellaneous solids such as wipes, cloths, and any absorbed wastes resulting from any cleanup activities
- Miscellaneous liquid wastes such as chemical or supply spill material, or other fluids, including waste oils and solvents
- Closeout waste liquids and rinsates
- Unused decontamination solution
- Used motor oil and filters (from diesel generator and compressors).



## **1.1 Scope**

This Waste Management Plan (WMP) addresses the management of wastes generated from the treatment of chemical agent-filled and empty items at DPG. The items are contained inside MRCs, PCCs, stainless steel (SS) cylinders, Interstate Commerce Commission (ICC) cylinders, PIG, M2A1 cans, or Department of Transportation (DOT) bottles.

Hazardous wastes will be managed in accordance with Resource Conservation and Recovery Act (RCRA) waste management requirements. All wastes generated from EDS operations will be placed into containers that meet the performance-oriented packaging requirements for the materials to be contained in accordance with DOT requirements.

After being containerized by EDS personnel, the wastes will be moved to a DPG less than 90-day waste storage area pending shipment to a permitted TSDF.

## **1.2 Roles and Responsibilities**

- EDS personnel will be responsible for day-to-day waste management activities.
- Edgewood Chemical Biological Center (ECBC) will provide 55-gallon drums.
- DPG will provide Wrangler Boxes.
- The DPG hazardous waste contractor will provide waste labels and identification numbers to EDS site operations for waste container tracking purposes.

- ECBC personnel will perform chemical agent analysis/screening to ensure the wastes meet the treatment level for chemical agents before the wastes are cleared for shipment from the EDS site.
- The DPG hazardous waste contractor will transport wastes from the EDS site to a DPG less than 90-day waste storage area. When waste containers are ready for pickup, the EDS System Manager will contact the DPG hazardous waste contractor to initiate procedures for transporting the waste.
- RCRA characterization samples will be collected by ECBC personnel at the EDS operation site. RCRA characterization samples will then be transferred to the DPG hazardous waste contractor for analysis at a Utah-certified laboratory.
- The DPG hazardous waste contractor will prepare hazardous waste manifest and Land Disposal Restriction (LDR) notification(s) and apply applicable RCRA hazardous waste codes to the various waste streams based on generator knowledge and/or sampling and analysis results.
- DPG will provide oversight for hazardous waste management to ensure that EDS operations are conducted according to applicable hazardous waste regulations, and will sign the waste manifest.
- The DPG hazardous waste contractor will be responsible for transporting the wastes from the DPG less than 90-day waste storage area to a RCRA-permitted TSDF that has been approved to receive the waste for final disposition.

## **2. WASTE DESCRIPTIONS**

This section describes the wastes that will be generated during EDS operations. Sampling and analysis methods are described in the Sampling Plan (**Annex G**) of the Destruction Plan. **Table F-2** lists the wastes that will be generated during EDS operations, their potential waste codes, basis for classification, and disposition.

### **2.1 Chemical Agent Neutralents**

Neutralent, the product of the treatment reaction, consists of either mustard, (HD/HT) MEA, and water; GB, MEA, and water; GD, MEA, and water; or VX, MEA, NaOH, and water, depending on the specific EDS chemical agent campaign. When treatment is complete, the neutralent waste will be drained from the EDS Containment Vessel into a liquid waste container via EDS conveyance lines. Once draining of the neutralent is complete, the EDS Containment Vessel will be manually rinsed with water. The rinsates from this activity are drained into a separate waste container.

### **2.2 Decontaminated Metal Parts and Fragments**

After EDS treatment has occurred, metal parts and fragments will remain. These wastes will be removed manually from the EDS Containment Vessel using non-sparking tongs or other hand-held tools. A debris pan is used to collect any liquids as well as the metal parts and fragments from the Containment Vessel when the door is opened and the parts and fragments are removed. Solid wastes are then removed from the debris pan and placed into a waste container and sealed. Any liquids in the debris pan will be placed into a liquid waste container.

Table F-2. EDS Chemical Agent Munitions and Chemical Samples Waste Designation, Rationale, and Disposition

Waste	RCRA Waste Code <sup>a</sup>	Basis for Classification	Disposition of Waste Material
Munitions Containing Mustard Agent	D003, D004 to D011, D022, D028, D034, D039, D040, D043, P999	<p>Munitions to be processed in the EDS contain explosive components (fuzes and/or bursters), which are Class 1.1 explosives per 49 CFR 173.53; thus are reactive (D003).</p> <p>Several TC organics have been identified as degradation compounds of mustard agents. These TC organics and regulatory levels are:</p> <ul style="list-style-type: none"> <li>• chloroform (D022) - 6.0 ppm</li> <li>• 1,2-dichloroethane (D028) - 0.5 ppm</li> <li>• hexachloroethane (D034) - 3.0 ppm</li> <li>• tetrachloroethylene (D039) - 0.7 ppm</li> <li>• trichloroethylene (D040) - 0.5 ppm</li> <li>• vinyl chloride (D043) - 0.2 ppm</li> </ul> <p>In addition, since munition bodies are constructed of specialty alloys containing heavy metals and over a period of time the chemical agent may have leached metals from munition casings, the U.S. Army conservatively designates chemical agents contained in munitions as TC metal wastes. The State of Utah lists chemical agent as P999.</p>	<p>Chemical agent munitions will be processed in the EDS. Explosives will be used to access the chemical agent fill. The fill will be chemically treated using a MEA/water mixture. Resultant neutralent, rinsewater, spent decontamination solutions, and solid wastes will be placed in containers and stored in a less than 90-day waste storage area pending shipment to a permitted TSDF.</p>

Table F-2. EDS Chemical Agent Munitions and Chemical Samples Waste Designation, Rationale, and Disposition  
(Continued)

Waste	RCRA Waste Code <sup>a</sup>	Basis for Classification	Disposition of Waste Material
Mustard Neutralent (HD or HT Decomposition Byproducts plus MEA and Water); MEA/Rinsewater	D001, D002, D004-D011, D018, D019, D022, D028, D039, D040, D043, P999/F999	TC organics are present as a result of degradation products from mustard agents. TC metals are present as a result of leached metals from munition casings. Resultant neutralent wastes meet the characteristics of corrosivity (pH greater than 12.5). MEA/rinsewater will be generated from rinsing EDS with clean water prior to treating subsequent munitions/items. The State of Utah lists chemical agent as P999 and treatment residues as F999.	Liquid waste will be placed in containers and stored in a less than 90-day waste storage area pending shipment to a permitted TSDF.
CWM Containing Chemical Agent Samples HD or HT	D022, D028, D034, D039, D040, D043, P999	Chemical agent samples will be processed in the EDS. Several TC organics have been identified as degradation compounds of mustard agents. These TC organics are: <ul style="list-style-type: none"> <li>• chloroform (D022) - 6.0 ppm</li> <li>• 1,2-dichloroethane (D028) - 0.5 ppm</li> <li>• hexachloroethane (D034) - 3.0 ppm</li> <li>• tetrachloroethylene (D039) - 0.7 ppm</li> <li>• trichloroethylene (D040) - 0.5 ppm</li> <li>• vinyl chloride (D043) - 0.2 ppm</li> </ul> The State of Utah lists chemical agent as P999.	Chemical agent samples will be processed in the EDS. Explosives will be used to access the chemical agent fill. The fill will be chemically treated using an MEA/water mixture. Resultant neutralent, rinsewater, spent decontamination solutions, and solid wastes will be placed in containers and stored in a less than 90-day waste storage area pending shipment to a permitted TSDF.

Table F-2. EDS Chemical Agent Munitions and Chemical Samples Waste Designation, Rationale, and Disposition  
(Continued)

Waste	RCRA Waste Code <sup>a</sup>	Basis for Classification	Disposition of Waste Material
Mustard Neutralent (HD or HT Decomposition Byproducts plus MEA and Water); MEA Rinsewater	D002, D018, D019, D022, D028, D039, D040, P999/F999	TC organics are present as a result of degradation products from mustard agent. Resultant neutralent waste meets the characteristic of corrosivity (pH greater than 12.5). MEA/rinsewater will be generated from rinsing EDS with clean water prior to treating subsequent munitions/items. The State of Utah lists chemical agent as P999 and treatment residues as F999.	Liquid waste will be placed in a less than 90-day waste storage area pending shipment to a permitted TSDF.
CWM Containing Chemical Agent Samples GB/GD	P999	Chemical agent samples will be processed in the EDS. The State of Utah lists chemical agent as P999.	Chemical agent samples will be processed in the EDS. Explosives will be used to access the chemical agent fill. The fill will be chemically treated using a MEA/water mixture. Resultant neutralent, rinsewater, spent decontamination solutions, and solid wastes will be placed in containers and stored in a less than 90-day waste storage area pending shipment to a permitted TSDF.
GB/GD Neutralent (GB/GD Decomposition Byproducts plus MEA and Water); MEA/Rinsewater	D002, P999/F999	Resultant neutralent wastes from treatment of chemical agent samples may meet the definition of corrosivity. MEA/rinsewater will be generated from rinsing EDS with clean water prior to treating subsequent munitions/items. The State of Utah lists chemical agent as P999 and treatment residues from the treatment of chemical agents as F999.	Liquid waste will be placed in containers and stored in a less than 90-day waste storage area pending shipment to a permitted TSDF.

Table F-2. EDS Chemical Agent Munitions and Chemical Samples Waste Designation, Rationale, and Disposition  
(Continued)

Waste	RCRA Waste Code <sup>a</sup>	Basis for Classification	Disposition of Waste Material
CWM Containing Chemical Agent Samples VX	P999	Chemical agent samples will be processed in the EDS. The State of Utah lists chemical agent as P999.	Chemical agent samples will be processed in the EDS. Explosives will be used to access the chemical agent fill. The fill will be chemically treated using an MEA/NaOH/water mixture. Resultant neutralent, rinsewater, spent decontamination solutions, and solid wastes will be placed in containers and stored in a less than 90-day waste storage area pending shipment to a permitted TSDF.
VX Neutralent (VX Decomposition Byproducts Plus MEA, NaOH, and Water); MEA/NaOH Rinsewater	D002, P999/F999	Resultant neutralent wastes may meet the definition of corrosivity. MEA/NaOH rinsewater will be generated from rinsing EDS with clean water prior to treating subsequent munitions/items. The State of Utah lists chemical agent as P999 and the treatment residues from the treatment of chemical agents as F999.	Liquid waste will be placed in containers and stored in a less than 90-day waste storage area pending shipment to a permitted TSDF.
Decontaminated HD/HT Metal Parts and Fragments	D004-D011, D018, D019, D022, D028, D039, D040, D043, P999/F999	Munition casings, fragments, and components are composed of metal alloys and may contain TC metals; TC organics may be present as a result of chemical agent mustard contamination. The State of Utah lists chemical agent as P999 and treatment residues from the treatment of chemical agent as F999.	Will be placed in containers and stored appropriately in a less than 90-day storage area pending shipment to a permitted TSDF.

Table F-2. EDS Chemical Agent Munitions and Chemical Samples Waste Designation, Rationale, and Disposition  
(Continued)

Waste	RCRA Waste Code <sup>a</sup>	Basis for Classification	Disposition of Waste Material
Decontaminated GB/GD Metal Parts and Fragments	D004-D011, P999/F999	Munition casings, fragments, and components are composed of metal alloys and may contain TC metals. The State of Utah lists chemical agent as P999 and treatment residues from the treatment of chemical agent as F999.	Will be placed in containers and stored appropriately in a less than 90-day storage area pending shipment to a permitted TSDF.
Decontaminated VX Metal Parts and Fragments	D004-D011, P999/F999	Munition casings, fragments, and components are composed of metal alloys and may contain TC metals. The State of Utah lists chemical agent as P999 and treatment residues from the treatment of chemical agent as F999.	Will be placed in containers and stored appropriately in a less than 90-day storage area pending shipment to a permitted TSDF.
Empty Propellant Charge Cans, MRCs and Other Containers	N/A	These containers meet the definition of RCRA empty under 40 CFR 261.7.	Empty containers will be monitored and reused or recycled as appropriate. If disposed of, waste containers will be managed in accordance with DPG requirements.
Unexploded Energetic Components	D003, D004-D011, P999/F999	Waste stream may be generated if incomplete detonation of munition energetics occurs. Components may still be reactive and may contain heavy metals. The State of Utah lists chemical agent as P999 and treatment residues from the treatment of chemical agents as F999.	In the remote possibility this waste stream is generated, any unexploded energetic components will be placed in containers and stored in a less than 90-day waste storage area pending shipment to a permitted TSDF.



Table F-2. EDS Chemical Agent Munitions and Chemical Samples Waste Designation, Rationale, and Disposition  
(Continued)

Waste	RCRA Waste Code <sup>a</sup>	Basis for Classification	Disposition of Waste Material
Miscellaneous Liquid Wastes from HD/HT Operations (Includes PDS Liquids, Closeout Waste Liquids and Rinsates, and Liquid Sump Wastes)	D001, D002, D004-D011, D018, D019, D022, D028, D039, D040, D043, P999/F999	For ease of operation, all liquid wastes generated from EDS operations will be classified the same as the neutralent waste. The State of Utah lists chemical agent as P999 and treatment residues from the destruction treatment of chemical agents as F999.	Will be placed in containers and stored appropriately in a less than 90-day waste storage area pending shipment to a permitted TSDF.
Miscellaneous Liquid Wastes from GB/GD Operations (Includes PDS Liquids, Closeout Waste Liquids and Rinsates, and Liquid Sump Wastes)	D001, D002, D004-D011, P999/F999	For ease of operation, all liquid wastes will be classified the same as the neutralent waste. The State of Utah lists chemical agent as P999 and treatment residues from the treatment of chemical agents as F999.	Will be placed in containers and stored appropriately in a less than 90-day waste storage area pending shipment to a permitted TSDF.
Miscellaneous Liquid Wastes from VX Operations (Includes PDS Liquids, Closeout Waste Liquids and Rinsates, and Liquid Sump Wastes)	D001, D002, D004-D011, P999/F999	For ease of operations, all liquid wastes will be classified the same as the neutralent waste. The State of Utah lists chemical agent as P999 and treatment residues from the treatment of chemical agents as F999.	Will be placed in containers and stored appropriately in a less than 90-day waste storage area pending shipment to a permitted TSDF.

Table F-2. EDS Chemical Agent Munitions and Chemical Samples Waste Designation, Rationale, and Disposition  
(Continued)

Waste	RCRA Waste Code <sup>a</sup>	Basis for Classification	Disposition of Waste Material
Grayloc <sup>®</sup> Seal and O-Ring; Used PPE; Rags, Generated During HD/HT Treatment Operations	D004-D011, D022, D028, D039, D040, D043, P999/F999	May be contaminated with chemical agent; thus, may contain TC metals and TC organics associated with chemical agent mustard. The State of Utah lists chemical agent as P999 and treatment residues from the treatment of chemical agents as F999.	Will be placed in containers and stored appropriately in a less than 90-day waste storage area pending shipment to a permitted TSDF.
Grayloc Seal and O-Ring; Used PPE; Rags, Generated During GB/GD Treatment Operations	D004-D011, P999/F999	May be contaminated with chemical agent; thus, may contain TC metals. The State of Utah lists chemical agent as P999 and treatment residues from the treatment of chemical agents as F999.	Will be placed in containers and stored appropriately in a less than 90-day waste storage area pending shipment to a permitted TSDF.
Grayloc Seal and O-Ring; Used PPE; Rags, Generated During VX Treatment Operations	D004-D011, P999/F999	May be contaminated with chemical agent; thus, may contain TC metals. The State of Utah lists chemical agent as P999 and treatment residues from the treatment of chemical agents as F999.	Will be placed in containers and stored appropriately in a less than 90-day waste storage area pending shipment to a permitted TSDF.
EDS Spent Filters (Spent Carbon HEPA and Pre-filters) from EDS Air Filtration System, Mask Canisters, and In-line Drum Filter	D004-D011, D018, D019, D022, D028, D039, D040, D043, P999/F999	May contain TC metals and TC organics associated with chemical agent mustard. May contain TC metals from GB/GD and VX munitions. The State of Utah lists chemical agent as P999.	Will be placed in containers and stored appropriately in a less than 90-day waste storage area pending shipment to a permitted TSDF. If breakthrough of the carbon filter system does not occur, only the first bank of carbon filters will be managed as hazardous waste.

Table F-2. EDS Chemical Agent Munitions and Chemical Samples Waste Designation, Rationale, and Disposition  
(Continued)

Waste	RCRA Waste Code <sup>a</sup>	Basis for Classification	Disposition of Waste Material
Laboratory Waste	D004-D011, D018, D019, D022, D028, D039, D040, D043, P999/F999	Laboratory waste includes decontaminated solids comprising laboratory labware, paper, vials, wipes, and gloves; decontaminated GC syringes; sampling equipment.	Will be placed in containers and stored appropriately in a less than 90-day waste storage area pending shipment to a permitted TSDF.
Used Motor Oil and Filters	N/A	Used motor oil and filters may be generated from maintenance on generator and compressor power units. Materials will be recycled; therefore, are not RCRA hazardous waste.	If generated, used motor oil and filters will be placed in containers and managed according to Utah Used Oil Regulations.

Notes:

<sup>a</sup> Waste codes presented for mustard and GB are actual waste codes applied from previous EDS operations at Dugway Proving Ground in 2004 and the accepted waste profiles generated. Other waste codes presented are based on process knowledge or anticipated from sampling and analysis results.

CFR = Code of Federal Regulations  
DOT = Department of Transportation  
EDS = Explosive Destruction System  
GB = sarin  
GC = gas chromatograph  
GD = soman  
H = LeVine mustard  
HD = distilled sulfur mustard  
HEPA = high efficiency particulate air  
HT = thickened mustard

MEA = monoethanolamine  
MRC = multiple round container  
N/A = not applicable  
NaOH = sodium hydroxide  
PDS = Personnel Decontamination Station  
PPE = personal protective equipment  
RCRA = Resource Conservation and Recovery Act  
TC = toxicity characteristic  
TSDF = treatment, storage, and disposal facility  
VX = O-ethyl S-(2-diisopropylaminoethyl)methylphosphonothioate

## **2.3 PCCs, MRCs, and Other Containers**

Once the chemical agent munition or sample items are removed from their outer containers, the empty outer containers will be monitored and reused as appropriate in accordance with DPG waste management requirements. Any dunnage used in packaging the chemical agent munition or sample items will be removed from the outer container and placed into solid waste containers. Separate containers will be used for decontaminated and uncontaminated dunnage wastes. Decontaminated dunnage will be managed in accordance with DPG waste management requirements.

## **2.4 Decontamination Waste**

Decontamination waste may be generated as a result of decontaminating a leaking munition/sample bottle, or contaminated dunnage. Leak stop and decontamination procedures will be carried out only to the extent necessary to prevent the spread of contamination to other surfaces or other wastes. For example, the leaking item may be wiped down with a bleach solution using cloths, sponges, or brushes, and the leak will be bandaged. The decontamination waste will then be placed in appropriate waste container(s) and managed in accordance with DPG waste management requirements.

## **2.5 Unexploded Energetic Components**

In the remote possibility this waste stream is generated, any unexploded energetic components will be containerized and stored pending shipment to a permitted TSDF.

## **2.6 Miscellaneous Liquid Wastes**

**2.6.1 Personnel Decontamination Station (PDS) Liquid Waste.** The PDS will consist of an equipment drop bath, a decontamination bath, and a shower. The decontamination bath will contain a mixture of soap and water. The shower will use

potable water. The equipment drop bath will contain a 5 percent bleach solution. Workers will use the decontamination bath on the used PPE if there is reason to suspect (for example, a chemical agent air monitor alarmed) an exposure to liquid agent has occurred. Liquid wastes from the decontamination station will be collected in drums.

**2.6.2 Closeout Waste Liquids and Rinsates.** During closeout procedures, used decontamination solution and rinsates will be generated. The liquid waste solutions will be containerized, characterized, and managed appropriately.

**2.6.3 Containment Pan/Sump Rinse Liquid Waste.** The EDS trailer has a built-in sump to collect any spillage from filling reservoirs or leakage from the waste collection system. When opening the Containment Vessel door or taking a sample, a debris pan will be in place to contain any spills, leaks, or other release of liquids. The trailer sump provides secondary containment if the Containment Vessel and debris pan fail. Any liquids collected in the sump will be sampled and analyzed for chemical agent and RCRA characterization.

**2.6.4 Unused Solvents, Reagents, and Decontamination Solutions.** Unused solvents, reagents, and decontamination solutions will be kept for future EDS operations or will be discarded and managed as a hazardous waste. These items include MEA, soapy water, and bleach.

## **2.7 Filters**

Waste filters consist of in-line carbon filter assemblies from the EDS Waste Transfer Subsystem vapor drum and filters (pre-filters, HEPA) from the EE air filtration system and carbon filters if the EE air filtration system carbon filters cannot be reused.

**2.7.1 In-line Drum Carbon Filter Assembly.** Two liquid waste drums (Waste Drum 1 and Waste Drum 1A) are connected to the EDS Containment Vessel and to a third waste drum (Waste Drum 2), which serves as a vapor drum. The first two drums are the liquid waste collection drums and the third drum provides pressure relief sizing. The vapor drum has a vent to release air displaced by liquid as the liquid waste drums are filled. The vent is fitted with a carbon filter canister (in-line drum carbon filter assembly) to capture chemical agent vapors.<sup>1</sup> Once the EDS vessel has been drained and the containerized liquid is at approximately ambient temperature, the waste drums will be closed. At the conclusion of each treatment process, the in-line drum carbon filter assembly will be removed, double bagged in plastic, and placed in an appropriate waste container. Only one drum carbon filter will be used per detonation.

**2.7.2 EE Air Filtration System Filters.** The air filtration system filters consist of pre-filters, HEPA, and carbon filters. First-time use filters that have never been exposed to chemical agent will be used in this EDS operation. The carbon filters in the air filtration system are changed in a bag-in-bag-out procedure and consist of two elements that can be changed individually. If the chemical agent monitor located midbed in the carbon filter detects breakthrough of the first filter element, that first filter element is replaced by the second element and a new second element is added.

During operations the filters will be changed out if agent breakthrough occurs, there are unacceptable pressure readings, or in the event of filter test failure. Waste carbon filter elements will be double bagged, placed in an appropriate waste container, and managed in accordance with DPG waste management requirements. At closure, if breakthrough has not occurred, only the first carbon filter element will be managed as hazardous waste.

The pre-filters and HEPA filters will be packaged separately from the carbon filter elements and managed as hazardous waste.

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<sup>1</sup> ECBC, *Filtration Performance of the Explosive Destruction System's Drum Filter*, November 2000.

## **2.8 Used PPE**

All used PPE will be contained and monitored in accordance with ECBC Internal Operating Procedures and Department of the Army Pamphlet (DA Pam) 385-61.

Launderable PPE will be monitored to the worker population limit (WPL) level prior to being sent to the laundry. All other used PPE will be managed as waste and monitored to 0.7 vapor screening level (VSL).

## **2.9 EDS Solid Waste**

This waste stream includes such items as disposable sampling equipment (for example, Depot Area Air Monitoring System [DAAMS] tubes), mask canisters, and cleanup materials such as rags and wipes.

## **2.10 Laboratory Waste**

The onsite laboratory support operations will generate solid and liquid wastes that will be managed at the EDS site. Solid wastes will consist of decontaminated labware, plastic, rags, wipes, PPE, vials, gloves, and decontaminated gas chromatograph (GC) syringes (sharps). Liquids will consist of decontaminated working standards in bleach (sodium hypochlorite); spent solvents (for example, 2-propanol and acetone). Solids will be separated from liquid wastes. Any remaining decontaminated samples/solutions will be placed back into the waste container the sample originated. Otherwise, the waste will be placed in appropriate containers.

## **2.11 Used Motor Oil and Filters**

Used motor oil and filters may be generated from maintenance of the power generators and compressors. If generated, the used oil and filters will be managed according to Utah Used Oil Regulations.

## **2.12 Grayloc Seal and O-Rings**

Grayloc seal and O-rings from the Containment Vessel door are generated when cleaning and preparing the EDS equipment prior to departing the operation site. These items will be decontaminated (if necessary) and placed into a waste container.

## **3. WASTE CHARACTERIZATION, TREATMENT EFFECTIVENESS, AND DISPOSITION REQUIREMENTS**

### **3.1 Waste Characterization**

The chemical munition items and chemical fill that will be treated during EDS operations have been characterized based on process knowledge and Materiel Assessment Review Board (MARB) assessment. Thus, no additional characterization is required before treatment in the EDS unit.

Chemical agent analysis/screening will be performed on every container of liquid and solid wastes, respectively, generated from this EDS operation at DPG. RCRA characterization will be performed on all wastes generated from each agent campaign. RCRA waste characterization will be based on process knowledge, material safety data sheets (MSDSs), and chemical and physical analyses results as appropriate. RCRA characterization sampling and analysis will be conducted on one liquid waste container generated from each agent type processed in the EDS.

### **3.2 Treatment and VSL Requirements**

Treatment effectiveness will be determined by chemical analysis and air monitoring for chemical agent mustard, GB/GD, and VX in the liquid neutralent/rinsewaters and treated solids, respectively. Neutralent, rinsate wastes, and waste solids generated during EDS operations at DPG will be analyzed/screened for chemical agent and may



not be transported from the EDS site unless liquid and solid waste sample results meet the following:

- *Liquid Wastes.*
  - Treatment level of 50 milligrams per liter (mg/L) or less for HD or HT and MEA/water neutralent; VX and MEA/NaOH/water neutralent, and rinsate wastes (MEA/water rinse or MEA/NaOH/water rinse)
  - Treatment level of 1 mg/L or less for GB or GD and MEA/water neutralent and rinsate wastes (MEA/water rinse).
- *Solid Wastes.*
  - HD/HT 0.7 VSL
  - GB 0.7 VSL
  - GD 0.7 VSL
  - VX 0.7 VSL.

As stated in the U.S. Army Chemical Materials Agency, *Programmatic Monitoring Concept Plan*, Final, June 2004, a treatment level is a negotiated concentration for a specified contaminant in a specified extract or total waste that must be met by any method designed to physically or chemically change the nature of a hazardous waste. A VSL is the level to which an item is monitored to determine the level of cleanliness. This is typically done by containing the item in an enclosed space to limit dilution.

All actual values determined for agent analysis/screening will be recorded.

### **3.3 Sampling and Analysis**

Sampling and analysis to determine treatment level, VSL, and RCRA characterization is described in **Annex G**, Sampling Plan, of this Destruction Plan.

### **3.4 Frequency of Analysis**

Chemical agent analysis/screening will be performed on every container of liquid and solid waste generated. RCRA characterization sampling and analysis will be conducted on one liquid waste drum generated from each agent type processed in the EDS.

## **4. CONTAINERS**

Waste generated from EDS operations will be placed in containers that are compatible with the materials to be contained and meet performance-oriented requirements for the materials to be contained in accordance with DOT. Each hazardous waste container will be marked with the words "Hazardous Waste." The contents will be placed in the container, which then will be stored in a less than 90-day waste storage area at DPG pending shipment offsite to a permitted TSDF for final disposition.

## **5. WASTE ANALYSIS RECORDS**

The Project Manager for Non-Stockpile Chemical Materiel (PMNSCM) will maintain a record system that includes documentation of all samples collected and analyzed, analyses conducted, preparations, quality control (QC) challenges, maintenance of laboratory equipment, and reports prepared. All information will be kept for a minimum of 3 years by PMNSCM and DPG.

## **6. WASTE TRACKING**

Waste tracking will be performed to track wastes from generation at the EDS site through disposal. A drum and sample tracking inventory spreadsheet will be used to track waste streams as they are generated. The Drum and Sample Tracking Inventory Sheet correlates the EDS drum and munition number (for example, shot number, drum item number 1, 2, 1A, PDS, SW) against various information fields such as an assigned DPG tracking number, accumulation start date, drum contents description, drum confirmation laboratory identification, and date sample collected, among others.

**Appendix F-1** contains an example of the waste tracking spreadsheet that will be used during EDS operations at DPG.

**APPENDIX F-1**  
**EXAMPLE OF DUGWAY PROVING GROUND DRUM AND**  
**SAMPLE TRACKING INVENTORY**

EXAMPLE ONLY

DUGWAY PROVING GROUND DRUM AND SAMPLE TRACKING INVENTORY  
System Start-Up - July 19, 2004

Container Item Number	DPG Tracking Number	Accumulation Start Date	Container and Contents Description	Container Confirmation Lab ID & Date Collected	Gross Weight (Lbs)	ECBC Sample Clearance Number	Container Confirmation Results	Date Container Removed from Service	Date Container Turned Over to DPG Personnel	DPG Haz Waste Storage Location	RCRA Sampling Date	EPA Hazardous Waste Manifest Number	Transporter Name, EPA ID, and Pick-Up Date	TSDF Name, Address, EPA ID Number, and Phone Number
Shot #1 DPG-94-012														
1	HW05850-W1	7/19/2004	55-gallon Steel Drum, Monoethanolamine (MEA) Neutralent	HD-04200-DL-01 7/18/2004	240	040001-DUG GC/MS (Analyzed twice due to failure of QC at the end of analysis, see 7/21/2004 lab summary sheet)	7/21/2004 results: Mustard 434 ppb Dithiane 76,213 ppb E Thioxane 174,014 ppb E	7/20/2004	7/20/2004	DPG CARR Storage Facility	8/9/2004 Cleared by Lab	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250 9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300
2	Recorded under Shot #9 (HW05906-W2)	N/A	55-gallon Steel Drum, Fill Vapor Displacement	N/A		N/A					See Shot #9	See Shot #9	See Shot #9	See Shot #9
1A	HW05851-W1A	7/20/2004	55-gallon Steel Drum, MEA/Water Rinsate	HD-04200-RL-01 7/19/2004	405	040002-DUG GC/MS	Mustard ND Dithiane 25,101 ppb E Thioxane 28,936 ppb E	7/20/2004	7/20/2004	DPG CARR Storage Facility	8/12/2004 Cleared by Lab	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250 9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300
3	Recorded under Shot #2 (HW05852-W3)	N/A	55-gallon Steel Drum, Water Rinsate and Sump Rinse		367						See Shot #2	See Shot #2	See Shot #2	See Shot #2
SW	HW05853-SW	7/20/2004	55-gallon Steel Drum, Munition and Metal Fragments	DUG40720001 7/20/2004	261	040720047-DUG MINICAMS	Mustard 0.58 TWA	7/20/2004	7/20/2004	DPG CARR Storage Facility	Cleared by MINICAMS	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250 9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300
SW2	HW05855-SW2	7/20/2004	55-gallon Steel Drum, Prop Charge Cannister and Metal Fragments	DUG40720005 7/20/2004	71	0407200051-DUG DAAMS	ND	7/20/2004	7/20/2004	DPG CARR Storage Facility	Cleared by MINICAMS	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250 9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300
PDS	HW05854-PDS	7/19/2004	55-gallon Steel Drum, Bleach and Water	HD-04200-PDS-01 7/19/2004	477	040003-DUG GC/MS	Mustard ND Dithiane ND Thioxane ND	7/20/2004	7/20/2004	DPG CARR Storage Facility	8/12/2004 Cleared by Lab	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250 9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300
O-Ring/C-Inline Filter 1	HW05856 – O-Ring/C-Filter 1	7/20/2004	95-gallon Poly Drum, O-Rings and Inline Drum Carbon Filters from EDS Operations at DPG. (Note: HW05856 Bar Code is for all items to be destroyed. Individual items are accounted for in the suffix to the Bar Code nomenclature). Transferred to 1 cubic yard Wrangler Box.	DUG04720003 7/20/2004		04720049-DUG MINICAMS	Mustard 0.021 TWA	7/20/2004	7/20/2004	DPG CARR Storage Facility	Cleared by MINICAMS	See Shot #13	See Shot #13	See Shot #13
Lab Trash	HW05857-Trash	7/20/2004	30-gallon Fiber Drum, plastic, rags, PPE, Gloves, Labware (plastic and glass pipets, test tubes, vials and caps, and Paper	DUG40720004 7/20/2004	42	040720050-DUG MINICAMS	Mustard 0.02 TWA	7/20/2004	7/20/2004	DPG CARR Storage Facility	Cleared by MINICAMS	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250 9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300

Container Item Number	DPG Tracking Number	Accumulation Start Date	Container and Contents Description	Container Confirmation Lab ID & Date Collected	Gross Weight (Lbs)	ECBC Sample Clearance Number	Container Confirmation Results	Date Container Removed from Service	Date Container Turned Over to DPG Personnel	DPG Haz Waste Storage Location	RCRA Sampling Date	EPA Hazardous Waste Manifest Number	Transporter Name, EPA ID, and Pick-Up Date	TSDF Name, Address, EPA ID Number, and Phone Number
Shot #2 DPG-94-013														
1	HW05858-W1	7/21/2004	55-gallon Steel Drum, Monoethanolamine (MEA) Neutralent	HD-04203-DL-01 7/21/2004  HW-04203-DL-02 7/21/2004	288	04072201-DUG  04072202-DUG GC/MS	Mustard 24,056 ppb D Dithiane 263,800 ppb E Thioxane 243,000 ppb E  Mustard 94 ppb E Dithiane 79,700 ppb E Thioxane 131,900 ppb E	7/23/2004	7/23/2004	DPG CARR Storage Facility	8/9/2004 Cleared by Lab	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250  9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300
1A	HW05859-W1A	7/22/2004	55-gallon Steel Drum, MEA/Water Rinsate	HD-04203-RL-01 7/22/2004	383	042203-DUG GC/MS	Mustard ND Dithiane 16,952 ppb E Thioxane 5,625 ppb E	7/23/2004	7/23/2004	DPG CARR Storage Facility	8/12/2004 Cleared by Lab	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250  9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300
3	HW05852-W3 (Combined with Shot #1)	7/20/2004	55-gallon Steel Drum, Water Rinsate and Sump Rinse	HD-04203-RL-02 7/22/2004		042205-DUG GC/MS	Mustard ND Dithiane ND Thioxane ND	7/23/2004	7/23/2004	DPG CARR Storage Facility	8/12/2004 Cleared by Lab	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250  9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300
SW	HW05860-SW	7/23/2004	55-gallon Steel Drum, Munition and Metal Fragments	DUG40720004 7/23/2004	275	040720086-DUG MINICAMS	N/D	7/23/2004	7/23/2004	DPG CARR Storage Facility	Cleared by MINICAMS	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250  9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300
PDS	HW05861-PDS	7/20/2004	55-gallon Steel Drum, Bleach and Water	Not classified as P999 or F999, Containerized PDS liquids did not contact any Chemical Agent or any Chemical Agent derived wastes in the course of the Shot #2 demilitarization activity. RCRA Characteristic analyses will be performed prior to shipment off-site for treatment or disposal.	264	N/A	N/A	7/23/2004	7/23/2004	DPG CARR Storage Facility	N/A (Contingency decon of PPE from PDS)	LO82398	Clean Harbors Env Svcs, Inc. MAD039322250  9/29/2004	Clean Harbors (Deer Park), Inc. 2027 Battle Ground Road Deer Park, TX 77536 TXD055141378 (281) 930-2300

Note:

Actual data presented are from EDS operations conducted at DPG July - September 2004, and are provided for example purposes.